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Merismatium, *Porpidia* and *Protoparmelia* spp. new for Turkey and Asia

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Abstract — Three lichen species collected from the Muş and Burdur regions (*Merismatium deminutum*, *Porpidia zeoroides*, *Protoparmelia atriseda*) have been determined as new to Turkey and Asia. Descriptions are accompanied by notes on geographic distribution and chemistry and comparisons with morphologically similar taxa.

Key words — *Ascomycota*, biodiversity

Introduction

Recent studies on the lichen biota of Turkey have contributed many new records for the country (Aptroot & Yazıcı 2012; Arslan et al. 2011; Yazıcı et al. 2010a,b,c; 2011a,b 2012; Karagöz & Aslan 2012; Karagöz et al. 2011; Kinalioglu & Aptroot 2011; Osyczka et al. 2011; Vondrák et al. 2012). However, there are still many lichenologically unexplored parts in Turkey and more explorations of those regions are needed.

Although approximately 650 lichen taxa have been noted from Turkey, including 389 taxa from Burdur province (Aptroot et al. 2015, Aslan & Yazici 2013, Çobanoğlu 2005, Öztürk et al. 2005, Pišút & Guttová 2008, Şenkardeşler 2009, Yazici et al. 2013, 2015), no lichen taxa have thus far been reported from the Muş region. Within our projects "Lichen and bryophyte flora of Burdur provinces" and "Lichen flora of Muş and Bitlis Provinces" we identified three lichens as new records for Turkey and for Asia.

Materials & methods

Kenan Yazici collected lichen samples in May, June, and July during a 2015 lichenological survey of the Muş and Burdur regions.

The Muş region (center, Bulanık and Varto districts) primarily encompasses vast areas of meadow, large plains, and steppe but no high mountains or canyons are seen (Baytop & Denizci 1963). Collecting localities are well-lit, windswept, treeless areas with gently sloping terrain containing streams, grass, and calcareous and siliceous rocks. The region's climate is characterized by very cold snowy winters and short hot dry short summers, with temperatures ranging from −29 to 41.6°C. Annual rainfall ranges from 350–1000 mm and the average humidity is 60.3% (Akman 1999).

The Burdur region (center, Kemer and Altınyayla districts) is mountainous and heavily forested with intermittent streams, lakes, and dams (Baytop & Denizci 1963). Forest tree species include *Abies*, *Cedrus*, *Ficus*, *Fraxinus*, *Juniperus*, *Olea*, *Pinus*, *Pistacia*, *Prunus*, *Quercus* (especially Altınyayla district), and *Rhus*. The subcanopy flora is very abundant although the nearby mountains are covered with marble rocks. The region has a continental Mediterranean climate characterized by cold snowy winters and very hot long dry summers. Temperatures range from −16 to 39°C with a mean annual temperature of 15°C, and the mean annual rainfall is about 468 mm with an average humidity of 51.2% (Akman 1999).

Samples were examined using a Nikon SMZ1500 stereomicroscope and Nikon Eclipse 80i compound light microscope and identified by consulting the relevant keys (Clauzade & Roux 1985, Hawksworth et al. 2010, Nash et al. 2001, Orange 2013, Poelt & Leuckert 1991, Roux et al. 2002, Smith et al. 2009).

The descriptions are based on Turkish specimens and vouchers are stored in the Herbarium of the Biology Department, Karadeniz Technical University, Trabzon, Turkey (KTUB).

Taxonomy

Merismatium deminutum (Arnold) Cl. Roux & Nav.-Ros.,
Mycotaxon 84: 3(2002) FIG. 1

Thallus immersed clearly, white to greyish white, thin, tartareous, perithecia in pits, numerous, with protecting, globose, immersed, minute, to 0.15 mm diam., leaving pits in the rock; involucrellum present; perithecial wall entire, with branched and anastomosing hyphae; cortical cells without papillae; exciple dark pigmented, brown to dark brown, K+ dark brown, with faint violet pigment around the ostiolar region; hyphae surrounding exciple colourless to brownish, either I− or I + violet. Hymenium without photobiont, hamathecial interascal filaments absent. Asci 8-spored, ascospores pale to dark brown, with a distinct perispore, (18–)22–29(–31) × 8–14 µm, ellipsoid or broadly oblong, muriform with 5–8 transverse septa and 6–15 cells.

SPECIMENS EXAMINED – **TURKEY. MUŞ:** VARTO, Çallıdere village, roadside, 39°16′25″N 41°14′18″E, 1705 m, on calcareous rock, 01.07.2015, leg. Kenan Yazıcı. (KTUB–2422); **BURDUR:** CENTER, towards Ulupınar village, roadside, 37°44′40″N 30°00′02″E, 1434 m, on calcareous rock, 25.06.2013, leg. Kenan Yazici. (KTUB–2451).

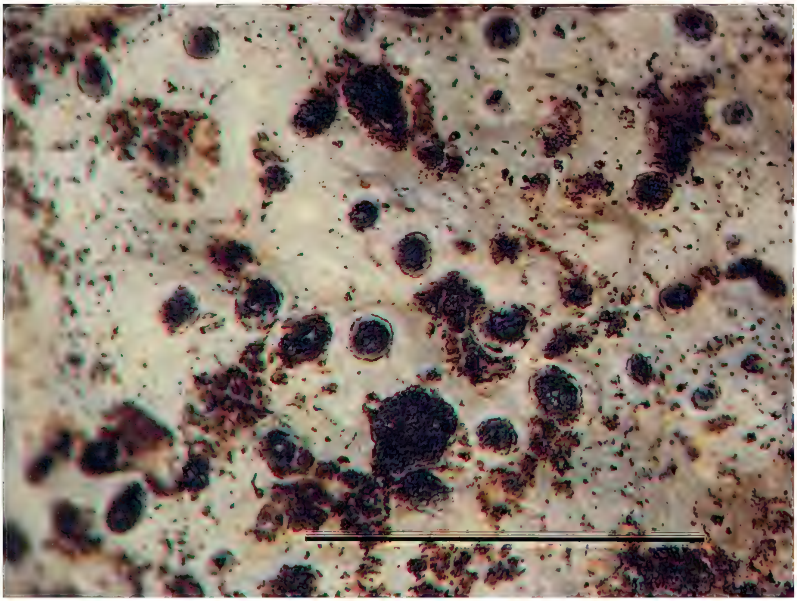

Fig. 1. *Merismatium deminutum* (KTUB-2422), habitus. Scale = 1 mm

Remarks—A detailed description is provided by Roux et al. (2002). *Merismatium deminutum* is similar to *M. discrepans* but differs by its larger spores with thick perispores. Both species occasionally grow parasitically on other lichens *M. deminutum* on *Staurothele orbicularis* and *M. discrepans* on species of *Catapyrenium*, *Protoblastenia*, *Aspicilia*, *Catillaria*, and *Hymenelia*.

Species associated with our specimens were *Acarospora cervina*, *Aspicilia cinerea*, *Candelariella vitellina*, *Lecanora dispersa*, *Placynthium nigrum*, *Protoparmeliopsis muralis*, *Verrucaria nigrescens*, and *V. parmigerella*. Previously known from Europe (England, Russia, Spain), *M. deminutum* is new to Turkey and Asia.

Porpidia zeoroides (Anzi) Knoph & Hertel, Mitt. Bot. Staatssamml. München 20: 477 (1984) Fig. 2

Thallus crustose, continuous, developed, pale white to chalk or ± grey white; surface, cracked, pruinose, papillose, verrucose, warty, rimose-areolate, fissured, to 6.5 cm diam., 2.5 mm thick; apothecia black, sessile, superficial disc, pruinose clearly, to 1.5–2 mm diam., flat, flattened, expanded, convex with receding margin later; medulla I–; hymenium 90–145 μm; hypothecium brown,

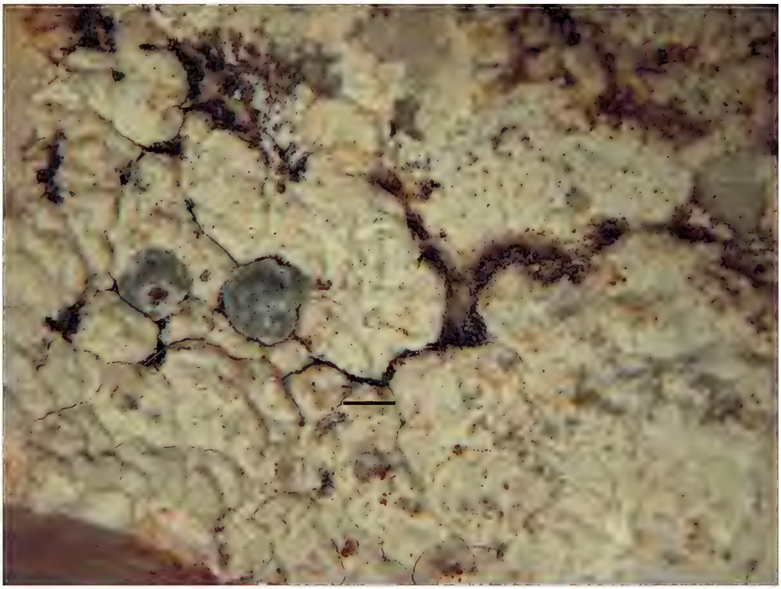

Fig. 2. *Porpidia zeoroides* (KTUB-2425), habitus. Scale = 1 mm

black-brown, with crystals; epihymenium pale brown to brown; excipulum developed, interior brown, fawn, with broad, relatively weakly pigmented outer region; asci 8-spored, *Porpidia*-type; ascospores 17–29 × 7–13 µm, ellipsoidal, lumen unilocular, hyaline, perispore; epispore absent, thin; conidiomata absent; conidia bacilliform; photobiont *Trebouxia*.

Specimens Examined – TURKEY. Muş: Center, 200 m to Alaniçi village, roadside, 38°39′16″N 41°21′11″E, 1709 m, on calcareous rock, 29.05.2015, leg. Kenan Yazıcı. (KTUB–2425), **Burdur:** Kemer, 3 km to Bozdağ, Bozdağ-Akpınar plateau, 37°19′37″N 30°04′45″E, 1425 m, on calcareous rock, 07.04.2013, leg. Kenan Yazıcı. (KTUB–2449).

Remarks— A detailed description of *Porpidia zeoroides* is provided by Smith et al. (2009). *Porpidia shangrila,* a similar species that also grows on calcareous rocks, differs by its endolithic thallus, and bluish green epihymenium. *Porpidia superba* is distinguished from *P. zeoroides* by its black apothecia and epithecium with an olivaceous pigment.

Porpidia zeoroides occurs mainly on calcareous rocks. Species associated with our specimens were *Acarospora cervina, Aspicilia caesiocinerea, Candelariella vitellina, Placynthium nigrum*, and *Protoparmeliopsis muralis*. Previously known from Europe and North America, *P. zeoroides* is new to Turkey and Asia.

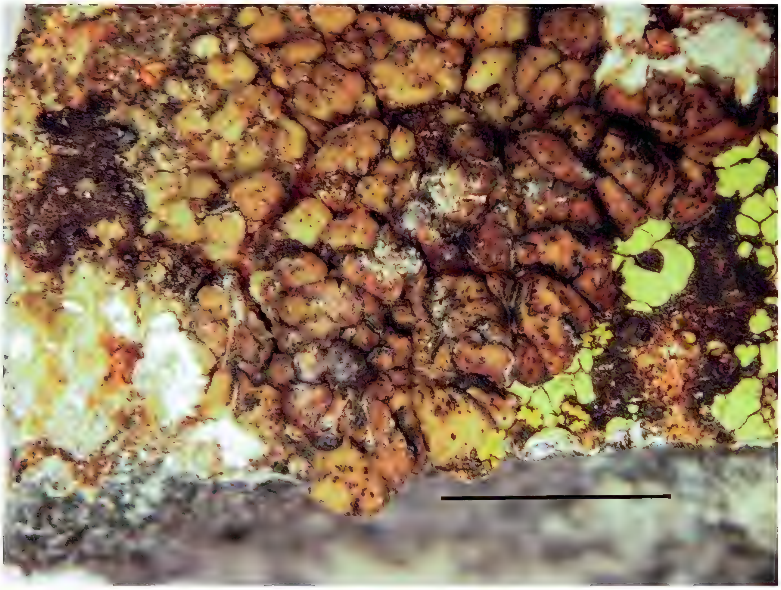

FIG. 3. *Protoparmelia atriseda* (KTUB-2426), habitus. Scale = 1 cm

Protoparmelia atriseda (Fr.) R. Sant. & V. Wirth, Die Flechten Baden-Württembergs, Verbreitungsatlas: 511 (1987) FIG. 3

Thallus crustose light brown to ±brown, glossy, ±developed, forming patches, to 3.5 cm across, ± thick, verrucae or areoles; areoles not compacted, convex or ± hemispherical, 0.4–0.9 mm in diam. Apothecia ± numerous, immersed at first, ≤1 mm diam.; disc chestnut brown to red-brown, convex; margin, thin, entire, later disappearing; exciple, concolorous with the thallus; epihymenium ±olive-brown; hymenium, hyaline, 45–50 µm tall, I+ blue; paraphyses coherent, ± brown at tips; asci clavate, 8-spored; ascospores hyaline, simple, oblong-ellipsoid to oblong with rounded ends, 7–14 × 4–6.5 µm. Pycnidia rare, immersed; conidia filiform, curved, 16–25 µm long. Cortex and apothecia (in sections) K+ yellow to red, C–, KC–, P+ yellow or orange, UV–, norstictic acid.

SPECIMENS EXAMINED – TURKEY. MUŞ: BULANIK, 5 km to Arakonak village, roadside 39°04′09″N 42°07′49″E, 1602 m, on calcareous rock, 30.06.2015, leg. Kenan Yazıcı. (KTUB–2426); **BURDUR:** ALTINYAYLA, Karanlıkdere canyon, 36°49′33″N 29°24′31.07″E, 1429 m, on calcareous rock, 23.08.2013, leg. Kenan Yazıcı. (KTUB–2448).

REMARKS— Detailed descriptions of *Protoparmelia atriseda* are provided by Smith et al. (2009) and Poelt & Leuckert (1991). A similar species, *P. nephaea,* differs in its smaller thallus patches, association with *Rhizocarpon geographicum* and *R. lecanorinum* (Poelt & Leuckert 1991), an absence of thalloconidia, differing K+ cortical and apothecial reactions, and disc colour.

Species associated with our specimens were *Candelariella vitellina, Montanelia sorediata*, and *Rhizocarpon geographicum*. Initially parasitic (especially on *R. geographicum* and *R. lecanorinum*), *P. atriseda* is later autonomous on well-lit upland or submontane hard siliceous rocks. Previously known from Europe (Belgium, Denmark, France, Poland) and North America, *P. atriseda* is new to Turkey and Asia.

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